**Bank Network Design and Implementation**

Redon Company Ltd is a US-Owned company that deals with Banking and Insurance. The company is intending to expand its services across the Asian Continent having the first branch to be located in Cyberjaya, Selangor, Malaysia. The company has secured a four-story building to operate within Malaysian Capital city. Therefore the company would like to allow securing the knowledge from a group of final year students from Limkokwing University of Creative Technology to design and implement their company network. Assume you are among the students to take over this role, carefully read down the requirements then model the design and implement the network based on the company needs. Each floor has departments as provided in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **First Floor** | | | |
| **No** | **Department** | **No of PC** | **No of Printer** |
| **1** | Management | 20 | 4 |
| **2** | Research | 20 | 4 |
| **3** | Human Resource | 20 | 4 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Second Floor** | | | |
| **No** | **Department** | **No of PC** | **No of Printer** |
| **1** | Marketing | 20 | 4 |
| **2** | Accounting | 20 | 4 |
| **3** | Finance | 20 | 4 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Third Floor** | | | |
| **No** | **Department** | **No of PC** | **No of Printer** |
| **1** | Logistics and Store | 20 | 4 |
| **2** | Customer Care | 20 | 4 |
| **3** | Guest Area | 40 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fourth Floor** | | | | |
| **No** | **Department** | **No of PC** | **No of Printer** | **No of Servers** |
| **1** | Administration | 20 | 2 |  |
| **2** | ICT | 20 | 2 |
| **3** | Server Room | 2 Admin PC | | 3 (DHCP, HTTP and Email) |

Requirements:

1. Use a software modeling tools to visualize the network topology

* Software Modeling Tools: MS Visio, Visual Diagram or Draw.io for network modeling design.

1. Use any of the following network simulation software to implement the above topology:

* Simulation Software: Cisco Packet Tracer or GNS3 for design and implementation.
* There should be one route on each floor. The router should be connecting switches on that floor.
* Use OSPF as the routing protocol to advertise the routes.
* Each department is required to have a wireless network for the users.
* Each department except the server room will be anticipated to have around 60 users both wired and wireless users.
* Host devices in the network are required to obtain IPv4 address automatically.
* Devices in all the departments are required to communicate each other.
* All the devices in the network are expected to obtain IPv4 address dynamically from the dedicated DHCP servers located at the server room.
* Create HTTP , and Email Server
* Configure SSH in all the routers for remote login

1. Use hierarchical network design with redundancy included:

* Having Core , Distribution and Access Layers

1. Configure the basic configuration on the devices :

* Hostnames
* Line console and VTY passwords
* Banner Message
* Disable Domain IP Lookup

1. Each department should be in different VLAN

* Create VLANs in every department
* VLANs you will use in your case, including 1 also e.g. 10, 20, 30 ….etc.
* Each VLAN should be a different subnetwork.

1. Planning IP Address:

* You have been given 192.168.10.0 as the base address for this network
* Do Subnetting based on the number of hosts in every department as provided above.
* Identify the subnet mask, Usable IP address range and Broadcast address for each subnet.

1. End devices Configurations:

* Configure all the end devices in the network with appropriate IP address based on the calculation above.

1. Configure port-security

* Use sticky command to obtain MAC address.
* Violation mode of the Shutdown.

1. Test Communication:

* Do devices in the same VLANs Communicate?
* Do devices in the different VLANs Communicate?

1. Document the project design and Implementation.

**Subnetting and IP addressing**

**Based Network: 192.168.10.0**

**First Floor**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Department** | **Network**  **Address** | **Subnet Mask** | **Host Address**  **Range** | **Broadcast**  **Address** |
| Management | 192.168.10.0 | 255.255.255.192/26 | 192.168.10.1 to  192.168.10.62 | 192.168.10.63 |
| Research | 192.168.10.64 | 255.255.255.192/26 | 192.168.10.65 to  192.168.10.126 | 192.168.10.127 |
| HR | 192.168.10.128 | 255.255.255.192/26 | 192.168.10.129 to  192.168.10.190 | 192.168.10.191 |

**Second Floor**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Department** | **Network**  **Address** | **Subnet Mask** | **Host Address**  **Range** | **Broadcast**  **Address** |
| Marketing | 192.168.10.192 | 255.255.255.192/26 | 192.168.10.193 to 192.168.10.254 | 192.168.10.255 |
| Accounts | 192.168.11.0 | 255.255.255.192/26 | 192.168.11.1 to  192.168.11.62 | 192.168.11.63 |
| Finance | 192.168.11.64 | 255.255.255.192/26 | 192.168.11.65 to  192.168.11.126 | 192.168.11.127 |

**Third Floor**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Department** | **Network**  **Address** | **Subnet Mask** | **Host Address**  **Range** | **Broadcast**  **Address** |
| Logistics | 192.168.11.128 | 255.255.255.192/26 | 192.168.10.129 to 192.168.10.190 | 192.168.10.191 |
| Customer Care | 192.168.11.192 | 255.255.255.192/26 | 192.168.11.193 to  192.168.11.254 | 192.168.11.255 |
| Guest Area | 192.168.12.0 | 255.255.255.192/26 | 192.168.12.1 to  192.168.12.62 | 192.168.12.63 |

**Fourth Floor**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Department** | **Network**  **Address** | **Subnet Mask** | **Host Address**  **Range** | **Broadcast**  **Address** |
| Administration | 192.168.12.64 | 255.255.255.192/26 | 192.168.10.65 to 192.168.10.126 | 192.168.10.127 |
| ICT | 192.168.11.128 | 255.255.255.192/26 | 192.168.11.129 to  192.168.11.190 | 192.168.11.191 |
| Server Room | 192.168.12.192 | 255.255.255.192/26 | 192.168.12.193 to  192.168.12.254 | 192.168.12.255 |

**Between the Router and Layer-3 Switches**

**Base Network Address: 10.10.10.0**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Network Address** | **Subnet Mask** | **Host Address**  **Range** | **Broadcast Address** |
|  | 10.10.10.0 | 255.255.255.252 | 10.10.10. 33to  10.10.10.34 | 10.10.10.35 |
|  | 10.10.10.4 | 255.255.255.252 | 10.10.10.37 to  10.10.10.38 | 10.10.10.39 |
|  | 10.10.10.8 | 255.255.255.252 | 10.10.10. 41to  10.10.10.42 | 10.10.10.43 |
|  | 10.10.10.12 | 255.255.255.252 | 10.10.10.45 to  10.10.10.46 | 10.10.10.47 |
|  | 10.10.10.16 | 255.255.255.252 | 10.10.10.49 to  10.10.10.50 | 10.10.10.51 |
|  | 10.10.10.20 | 255.255.255.252 | 10.10.10.53 to  10.10.10.54 | 10.10.10.55 |
|  | 10.10.10.24 | 255.255.255.252 | 10.10.10. 33to  10.10.10.34 | 10.10.10.35 |
|  | 10.10.10.28 | 255.255.255.252 | 10.10.10. 37to  10.10.10.38 | 10.10.10.39 |
|  | 10.10.10.32 | 255.255.255.252 | 10.10.10. 41to  10.10.10.42 | 10.10.10.43 |
|  | 10.10.10.36 | 255.255.255.252 | 10.10.10. 45to  10.10.10.46 | 10.10.10.47 |
|  | 10.10.10.40 | 255.255.255.252 | 10.10.10. 49to  10.10.10.50 | 10.10.10.51 |
|  | 10.10.10.44 | 255.255.255.252 | 10.10.10.53 to  10.10.10.54 | 10.10.10.55 |
|  | 10.10.10.48 | 255.255.255.252 | 10.10.10. 33to  10.10.10.34 | 10.10.10.35 |
|  | 10.10.10.52 | 255.255.255.252 | 10.10.10. 37to  10.10.10.38 | 10.10.10.39 |